

5960

Stratford Water & Electric

Office

265 N. Third Ave.
PO Box 12
Stratford WI 54484-0012
715-687-4166

Shop

212 S. Third Ave.
PO Box 12
Stratford WI 54484-0012
715-687-4118

January 26, 2001

Jim Loock, Chief Electric Engineer
Public Service Commission
610 N. Whitney Way
P.O. Box 7854
Madison, WI 53707-7854

RE: In the Matter of Filing Plans for Appropriate Inspection and Maintenance, PSC Rule 113.0607.

Dear Mr. Loock:

Enclosed for filing are 3 copies of Stratford Water & Electric Utility's Preventative Maintenance Plan detailing inspection maintenance schedules, condition rating criteria, corrective action schedules, record keeping procedures and report filing schedules as documented in this rule.

Very truly yours,



Jerry Frodl
Superintendent

Enclosures

RECEIVED

JAN 30 2001

Electric Division

WISCONSIN PLATE
PREVENTATIVE MAINTENANCE PLAN

2001 JAN 30 P 3:21

Stratford Water & Electric Utility

FILING DEADLINE

FEBRUARY 1, 2001

December 19, 2000

Jerry Frodl

212 S Third Ave

PO Box 12

Stratford WI 54484-0012

715-687-4118

pubworks@tznet.com

RECEIVED

JAN 30 2001

Electric Division

This plan was prepared by the MEUW work group for PSC Rule 113.0607 for use by the 82 municipal electric utilities in Wisconsin and endorsed by PSC staff as meeting the requirements of Rule PSC 113.0607.

TABLE OF CONTENTS

	Page
I. Preventative Maintenance Plan	2
II. Inspection Schedule and Methods	2
III. Condition Rating Criteria	3
IV. Corrective Action Schedule	4
V. Record Keeping	4
VI. Reporting Requirements	4
VII. Distribution – overhead inspection guide	5
VIII. Distribution – underground inspection guide	8
IX. Substation - Monthly inspection guide	10
X. Substation – Annual Inspection Guide	10
XI. Transmission – Annual Inspection Guide	10
XII. Transmission – 5 Year Inspection Guide	10

FORMS

OVERHEAD DISTRIBUTION INSPECTION FORM	7
UNDERGROUND DISTRIBUTION INSPECTION FORM	9

I. Preventative Maintenance Plan

The PSC 113.0607 rule reads;

Appropriate inspection and maintenance: system reliability.

(1) PREVENTATIVE MAINTENANCE PLAN. Each utility or other person subject to this chapter, including persons who own electric generating facilities in this state who provide service to utilities with contracts of five years or more, shall develop and have in place its own preventative maintenance plan. This section is applicable to electric generating facilities as set forth at s. 194.491(5)(a)(1), Stats. Each plan shall include, among other things, appropriate inspection, maintenance and replacement cycles where applicable for overhead and underground distribution plant, transmission, generation¹, and substation facilities.

(2) CONTENTS OF THE PLAN. (a) *Performance standard.* The Preventative Maintenance Plan shall be designed to ensure high quality, safe, and reliable service, considering: cost, geography, weather, applicable codes, national electric industry practices, sound engineering judgment and experience.

- 1 *PSC staff interpretation is that generation applies to individual generators equal to or greater than 50 MW.*

II. Inspection Schedule and Methods:

The purpose of this plan is to maintain or improve the electrical system reliability with the objective of increased municipal loyalty and satisfaction from our constituents. The goals are to meet and exceed the schedules established in this plan.

Exception reporting (inspected equipment not in good condition) will be the method of documentation on all inspection forms.

The scope of this plan is traditional and uses proven maintenance techniques. Unique operating and maintenance philosophies have not been considered. Also, manufacturer defects will be dealt with as they are communicated to this utility.

SCHEDULE:	MONTHLY	ANNUAL	EVERY 5 YEARS
Transmission ($\geq 69\text{Kv}$ and above)		N/A	N/A
Substations	N/A	N/A	
Distribution (OH & UG)			X

The inspection of Distribution facilities will be by individual substation circuits on a 5-year cycle such that the entire system will be inspected every 5 years. Inspector instructions for inspecting all facilities and forms are included with the plan.

METHODS: Five criteria groups will be used to complete the inspection of all facilities.

1. IR – infrared thermography used to find poor electrical connections and/or oil flow problems in equipment.
2. RFI - Radio Frequency Interference, a byproduct of loose hardware and connections, is checked using an AM radio receiver.
3. SI – structural integrity of all supporting hardware including poles, crossarms, insulators, structures, bases, foundations, buildings, etc.
4. Clearance – refers to proper spacing of conductors from objects, trees and other utility cables.
5. EC – equipment condition on non-structural components such as circuit breakers, transformers, regulators, reclosers, relays, batteries, capacitors, etc.

III. Condition Rating Criteria:

This criterion, as listed below, establishes the condition of a facility and also determines the repair schedule to correct deficiencies.

- 0) Good condition
- 1) Good condition but aging
- 2) Non-critical maintenance required – normally repair within 12 months
- 3) Priority maintenance required – normally repair within 90 days
- 4) Urgent maintenance required – report immediately to the utility and repair normally within 1 week

IV. Corrective Action Schedule

The rating criteria as listed above determine the corrective action schedule.

V. Record Keeping

All inspection forms and records will be retained for a minimum of 10 years. The inspection form contains all of the required critical information i.e. inspection dates, condition rating, schedule for repair and date of repair completion.

VI. Reporting Requirements

A report and summary of this plan's progress will be submitted every two years with the first report due to the Commission by February 1, 2003. The report will consist of a letter documenting the percent of inspections achieved compared to the schedule and a description of maintenance achieved within the scheduled time allowance.

VII DISTRIBUTION – OVERHEAD INSPECTION GUIDE

STRUCTURE

- Pole Condition
- Pole Leaning
- Crossarm Condition
- Insulators, Deadend, Pin
- Excess Fill or Soil Removal
- Pole Steps
- Grounds Intact
- Ground Molding
- Down Guys
- Guy Markers
- Guy Bonding/Insulator
- Signage - Location Number, Warning Sign
- Customer Equipment
- Conductor
- Tie Wires
- U Guard/Conduit Condition

EQUIPMENT

- Transformers
 - ✓ Oil Leaks
 - ✓ Bushing Condition
 - ✓ Grounding/Bonding
- Capacitors
 - ✓ Fuses Blown
 - ✓ Bushing Condition
 - ✓ Oil Leaks
 - ✓ Tank Bulged
 - ✓ Switches, Oil, Vacuum
 - ✓ Control Conduit/Wiring
 - ✓ Grounding/Bonding
- Switches - GOAB, Inline, Disconnect
 - ✓ Insulator Condition
 - ✓ Operating Handle/Locks
 - ✓ Linkage
 - ✓ Grounding/Bonding
 - ✓ Switch Number
- Cutouts
 - ✓ Insulator Condition
 - ✓ Fuse Size Tag

VII DISTRIBUTION – OVERHEAD INSPECTION GUIDE (con't)

EQUIPMENT (CON'T)

- Arrestor
 - ✓ Insulator Condition
 - ✓ Connections
 - ✓ Ground Lead Disconnection
- Cable Terminators
 - ✓ Insulator Condition
 - ✓ Grounding/Bonding

CLEARANCES

- Ground Line
- Buildings, Bridges, Swimming Pool, Etc.
- Communications Facilities
- Fuel Tanks
- Other Electric Utilities
- Transmission Lines
- Over Streets, Roads, Alleys, Highways
- Tree Trimming
 - ✓ Clearance From Line
 - ✓ Vines on Poles
 - ✓ Danger Trees

INFRARED SCAN

- Main Three-Phase Feeders
- Priority Overhead Transformer Banks
 - ✓ Bushing Connectors Primary
 - ✓ Bushing Connectors Secondary
 - ✓ General Tank Heating
- Current & Voltage Transformers if Applicable

RFI CHECK

- OH system with AM radio as each circuit is inspected

OVERHEAD DISTRIBUTION INSPECTION FORM

Date 01-24-01 Inspected by D.P. Sub N/A Ckt West loop pg.1

MAP AREA	STRUCTURE		EQUIPMENT	CLEARANCE	COMMENTS	Rating Criteria	Date Item Corrected	Corrected By
	LOCATION	ITEM						
2703 25E17	0 0 0 NA 0 0 0 NA 0 0					0) Good Condition		
2703 25E1	0 0 0 NA 0 0 0 NA 0 0					1) Good Condition but aging		
2703 25E2	0 0 0 NA 0 0 0 NA 0 0					2) Non-critical Maintenance Required		
64AA56	0 0 0 NA 0 0 0 NA 0 0					3) Priority Maintenance Required		
?	0 0 0 NA 0 0 0 NA 0 0					4) Urgent Maintenance Required		
64CC38	0 0 0 NA 0 0 0 NA 0 0							
64EE38	0 0 0 NA 0 0 0 NA 0 0							
65CC33	0 0 0 NA 0 0 0 NA 0 0							
65BB33	0 0 0 NA 0 0 0 NA 0 0							
65AA43	0 0 0 NA 0 0 0 NA 0 0							
65BB43	2 0 0 0 NA 0 0 0 NA 0 0							
65AA53	0 0 0 0 NA 0 0 0 NA 0 0							
65BB53	0 0 0 0 NA 0 0 0 NA 0 0							
65AA63	0 0 0 0 NA 0 0 0 NA 0 0							
65BB63	0 0 0 0 NA 0 0 0 NA 0 0							
65AA73	0 0 0 0 NA 0 0 0 NA 0 0							

OVERHEAD DISTRIBUTION INSPECTION FORM

Date 01-24-01 Inspected by D.P. Sub N/A CtrtWest Loop pg.2

MAP AREA	STRUCTURE	EQUIPMENT	CLEARANCE	COMMENTS			
				Rating Criteria			
65BB73	Pole Condition/Leaning	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0	0) Good Condition	0 0 0 0	0 0 0 0	0 0 0 0
75AA3	Crossarm Condition	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0	1) Good Condition but aging	0 0 0 0	0 0 0 0	0 0 0 0
?	Insulators, DE, Pin	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0	2) Non-critical Maintenance Required	0 0 0 0	0 0 0 0	0 0 0 0
75AA4	Grounds Intact, Molding	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0	3) Priority Maintenance Required	0 0 0 0	0 0 0 0	0 0 0 0
75BB4	Pole Steps	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0	4) Urgent Maintenance Required	0 0 0 0	0 0 0 0	0 0 0 0
75CC4	Guy Bond, Insulator	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
75DD4	Guy Bonds, Locat, Warming	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
75AA5	Customer Equipment	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
75BB5	Conductor and Ties	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
66AA71	U-Guard/Conduit Cond	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
66BB61	Transformer	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
66BB51	Switches	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
?	Cutouts	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
?	Arresters	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
?	Street Light	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
?	Tree Trimming	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
66AA41	Ground Line Clearances	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
66AA41	Building Clearances	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
66AA41	Streets, Roads, Alleys	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
66AA41	Communication Clearance	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				
66AA41	Corrected By	0 0 0 N/A 0 N/A 0 N/A 0 N/A	0 0 0 0 0 0 0 0				

OVERHEAD DISTRIBUTION INSPECTION FORM

Date 11-24-01 Inspected by D.P. Sub N/A Ckt West Loop pg.3

MAP AREA	STRUCTURE	EQUIPMENT	CLEARANCE	COMMENTS			
				Rating Criteria			
LOCATION	Date Item Corrected				Corrected By		
	0) Good Condition	1) Good Condition but aging	2) Non-critical Maintenance Required	3) Priority Maintenance Required	4) Urgent Maintenance Required		
66BB31							
66AA31							
66BB21							
66AA21							
66BB11							
66AA11							
66CC1							
66BB1							
?							
66AA1							
65AA6							
55DD75							
55EE75							
55FF75							
56AA61							
56AA51							

OVERHEAD DISTRIBUTION INSPECTION FORM

Date 01-24-01 Inspected by D.P. Sub N/A ck West Loop pg. 4

MAP AREA	STRUCTURE	EQUIPMENT	CLEARANCE	COMMENTS				
				Rating Criteria				
LOCATION				0) Good Condition	1) Good Condition but aging	2) Non-critical Maintenance Required	3) Priority Maintenance Required	4) Urgent Maintenance Required
56AA52	Pole Condition/Leaning	0 0 0 NA 0	NA NA 0 0 0	NA 0 NA NA 0	0 0 0 NA 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
56DD41	Crossarm Condition	0 0 0 NA 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
56BB41	Insulators, DE, Pin	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
56AA41	Pole Condition/Leaning	0 0 0 NA 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
	Soil Conditions							
	Pole Steps							
	Grounds intact, Molding							
	Down Guy's and Markers							
	Guy Bond, Insulator							
	Signs, Lock, Warning							
	Customer Equipment							
	Conductor and Ties							
	U/Guard/Conduit Conn'd							
	RFI Check							
	Transformer							
	Switches							
	Cutouts							
	Arresters							
	Street Light							
	Tree Trimming							
	Ground Line Clearances							
	Building Clearances							
	Streets, Roads, Alleys							
	Communication Clearance							
	Corrected By							
	Date item Corrected							

OVERHEAD DISTRIBUTION INSPECTION FORM

Date 01-24-01 Inspected by D.P. Sub N/A CritFast Loop pg.1

MAP AREA	STRUCTURE	EQUIPMENT	CLEARANCE	COMMENTS			
				Rating Criteria			
2704 19W9	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0	0) Good Condition 1) Good Condition but aging 2) Non-critical Maintenance Required 3) Priority Maintenance Required 4) Urgent Maintenance Required			
2704 19W8	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
2704 19W7	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
2704 19W6	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
2704 19W1	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
46BB71	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
46JJ72	0 0 0 NA 0 NA NA 0	0 2 0 NA 0 NANA NANA 0	NANA 0 0 0 NANA 0 0 0	Guy wire for phone loose			
46KK72	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
46AA73	0 0 0 NA 0 0 NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
56BB3	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
56AA12	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
56BB22	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
56BB32	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
56AA32	0 0 0 NA 0 NA NA 0	0 0 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0				
2704 19L5	0 0 0 NA 0 NA NA 0	0 2 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0	Guy wire for phone loose			
56AA31	0 0 0 NA 0 0 0 0	0 2 0 0 0 0 0 0	NANA 0 0 0 NANA 0 0 0	Guy wire for phone loose			

Date item Corrected
Corrected By

VIII DISTRIBUTION – UNDERGROUND INSPECTION GUIDE

STRUCTURAL (Exterior & Interior) Transformer, Primary Pedestal, Secondary Pedestal, Switchgear.

- Enclosure Condition
- Level/Leaning
- Security
- Grade/Accessibility (Shrubs, Customer Facilities, Fill/Excavation)
- Numbering
- Voids/Gaps
- Signage - Location Number, Warning Sign
- Pad/Vault Condition

EQUIPMENT

- Transformers
 - ✓ Oil Leaks
 - ✓ Bushing Condition
 - ✓ Grounding/Bonding
 - ✓ Elbows
 - ✓ Arrestors
 - ✓ Feed-Through
 - ✓ Cable Condition
 - ✓ Secondary Connections
- Primary Pedestals
 - ✓ Elbows
 - ✓ Junction Condition
 - ✓ Grounding/Bonding
- Secondary Pedestals
 - ✓ Secondary Connections
- Switches – URD Switchgear
 - ✓ Insulator Condition
 - ✓ Operating Handle Security
 - ✓ Linkage
 - ✓ Grounding/Bonding
 - ✓ Switch Number/Fuse Size & Number

INFRARED SCAN and RFI CHECK

- Main Three-Phase Feeders (Risers & Switchgear)
- Priority URD Transformer Banks
 - ✓ Bushing Connectors Primary
 - ✓ Bushing Connectors Secondary
 - ✓ General Tank Heating

UNDERGROUND DISTRIBUTION INSPECTION FORM

Date 1-24-01 Inspected by D.P. Sub N/A Circuit West Loop

MAP AREA	STRUCTURE	EQUIPMENT	IR / RFI Scan	COMMENTS	Corrected By	
					Date Item Corrected	Corrected By
2703 25E3	Level / Leaning	Enclosure Condition				
2703 25E5	Security	Grade / Accessibility				
2703 25E6	Numbering	Voids / Gaps				
2703 25E7	Signage	Pad / Vault Condition				
2703 25E13	Transformers, Leaks, Bushings, Grounding, Bonds, Elbows, Arrestors, Cables, Connections	Primary Pedestals, Elbows, Grounding, Bonds, Junction conn.				
2703 25E10	Switchgear	Secondary Pedestals, Connections				
2703 25E18	Main Three Phase Feeders, Risers & Switchgear	Priority URD Transformers, Bushings and Tank heating				
2703 25E11	Switches, Strangage, Insulators, Security, Bonds, Ground, Leaks, Bushings, Grounding, Bonds, Elbows, Arrestors, Cables, Connections	Priority URD Transformers, Bushings and Tank heating				
64BB56						

IX SUBSTATION - MONTHLY INSPECTION GUIDE

Stratford Water and Electric has no substation and has no plans for a substation.

Section VII

Circuit No. and Description	Substation
West 24.9 kV Loop	WPSC 24.9 kV Interconnection
East 24.9 kV Loop	WPSC 24.9 kV Interconnection

Section VIII

The Utility does not have any transmission lines or substations as part of their system. The Utility's goal is to complete inspection of 20 – 35 percent of the distribution system each year. In addition, the Utility expected to complete all scheduled maintenance resulting from the inspection within the prescribed time period specified in the rating criteria.

All of the inspected goals were met for this two year period. Approximately 30% of the 24.9 kV part of the system was inspected. No urgent maintenance items were found. The inspection found the following items:

Overhead System	#2 Non-critical 3 (Customer equipment) #2 Non-critical 3 (No high voltage signs) #2 Non-critical 1 (Slight leaning pole) #2 Non-critical 5 (No pole numbers)
Underground System	#2 Non-critical 1 (Slight lean to secondary pedestal) #2 Non-critical 4 (No 10' clearance signs)

All the critical maintenance items found were repaired on time except the leaning pole which will be repaired by our construction contractor Wis. Public Service Corp. in approximately 3 weeks, and the telephone company was informed about the 3 items of customer equipment.

Section IX

During the last three years, approximately 60% of the old 4 kV system was converted to 24.9 kV. This conversion work resulted in a 24.9 kV loop between the two WPSC's 24.9 kV interconnection that serves the Utility's system. All of the needed maintenance along this line was completed as part of the conversion work. The Utility's Plan is to continue conversion of the 4 kV systems over the next five years concentrating on the oldest parts to eliminate potential maintenance problems.